Double Autosomal Trisomy (Trisomy D+G) with Mosaicism

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Reports of patients with double autosomal trisomy are rare (Table). In contrast, patients with double aneuploidy involving autosomal and sex chromosomes are slightly more frequent (Zellweger and Abbo, 1967). The reason for this is not known.

The case we wish to report is a double autosomal trisomy with mosaicism involving group D and G chromosomes.

Case Report

The patient, a male, the seventh child of a 37-year-old father and a 34-year-old Caucasian mother, was the product of a pregnancy complicated by massive polyhydramnios. The mother previously had had two miscarriages. During the present pregnancy she had not had any infections or X-irradiation. There was no family history of congenital malformations, mental retardation, leukemias, autoimmune disease, or diabetes.

Three days after birth the patient was transferred to the Albany Medical Center Hospital because of persistent vomiting, absent bowel movements, and x-rays showing massive distension of the stomach and proximal duodenum, with no gas in the distal intestine. In addition, the child had the features of Down's syndrome: flat facial profile, epicanthic folds, oblique palpebral fissures, Brushfield spots, broad hands and short fingers, incurring little fingers, and bilateral simian creases. He was, however, hypertonic, and held his back in opisthotonos suggesting the presence of other abnormalities (Fig.). The cerebrospinal fluid was normal.

At operation an annular pancreas was found compressing the duodenum at the junction between the first and second portions. A duodenostomy was performed but in spite of this the child died shortly after the operation.

Cytogenetics. Chromosomal analyses were made from preparations obtained from cultures of peripheral blood lymphocytes. The chromosomes from 43 cells were karyotyped. Forty-one cells had 47 chromosomes of which 10 had 47,XY,G + and 31 had 47,XY,D+. The remaining two cells had 48,XY,D+,G+.

Discussion

The only previously reported case of 47,XX, D+/47,XX,G+ mosaicism also had some of the characteristic signs of Down's syndrome, and also was the daughter of an older mother (39 years). She did, however, have some of the features of the D1 trisomy syndrome, such as micrognathia, spasticity, and rockerbottom feet (Smith, Tips, and Howard, 1965) (Table).

Of the cases with 47,XX,E+/47,XX,G+ mosaicism, one showed predominantly the features of the trisomy-18 syndrome (Hsu et al., 1965), the others the features of Down's syndrome (Marks, 1965). The case we report falls between these extremes, showing some of the features of both Down's and trisomy-18 syndromes.

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TABLE

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<thead>
<tr>
<th>Author</th>
<th>Cell Lines</th>
<th>Clinical Features</th>
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<tbody>
<tr>
<td>Hsu et al. (1965)</td>
<td>46,XX</td>
<td>Trisomy-18 syndrome</td>
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<td>Smith et al. (1965)</td>
<td>46,XX</td>
<td>Down's syndrome with micrognathia, rockerbottom feet, and spasticity</td>
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<tr>
<td>Baikie et al. (1965)</td>
<td>47,XX,D+</td>
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<td>Marks et al. (1967)</td>
<td>47,XX,E+</td>
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<td>Zellweger and Abbo (1967)</td>
<td>47,XX,G+</td>
<td>Down's syndrome with duodenal atresia and hypertonia</td>
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<td>Zellweger and Abbo (1967)</td>
<td>47,XY,D+</td>
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<tr>
<td>Zellweger and Abbo (1967)</td>
<td>47,XY,E+</td>
<td>Down's syndrome with annular pancreas and hypertonia</td>
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<td>This report</td>
<td>47,XY,G+</td>
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Wiggins, and Spector, 1967; Zellweger and Abbo, 1967). It is interesting that the latter case also presented with duodenal atresia and hypertonia.

The two cases with \(47,XX,D^+ / 47,XX,E^+\) mosaicism had a mixture of the characteristic clinical signs of these syndromes (Baikie, Garson, and Birrell, 1965; Zeliweger and Abbo, 1967).

The simplest explanation of the way the mosaicism arose in our case seems to be that the aneuploidy arose by nondisjunction during meiosis in gametogenesis followed by nondisjunction or anaphase lag during mitosis in the zygote.

Two other cases of double autosomal trisomies have been reported (Gagnon et al., 1961; Becker, Burke, and Albert, 1963). These were not, however, mosaics.

Summary

A boy with multiple congenital malformations and three chromosomal stem lines, \(47,XY,D^+, 47,XY,G^+,\) and \(48,XY,D^+,G^+\), has been described, and the other reported cases of double autosomal trisomy have been reviewed briefly.

REFERENCES


